

Endoclip Migration into the Common Bile Duct with Stone Formation: A Rare Complication after Laparoscopic Cholecystectomy

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ABSTRACT

Introduction: Endoclip migration into the common bile duct after laparoscopic cholecystectomy is a rare complication. Very few cases have been reported in the literature, mostly in the form of case reports.

Case Description: We report a case of Endoclip migration into the bile duct with stone formation 6 y after laparoscopic cholecystectomy. The patient presented with recurrent abdominal pain and intermittent jaundice for 6 mo. Diagnosis was suspected when a computed tomography scan of the abdomen showed a metallic density artifact in the lower end of the bile duct. The diagnosis was confirmed by endoscopic retrograde cholangiopancreatography. The patient was successfully managed by endoscopic stone and clip removal.

Discussion: Endoclip migration with biliary complications should be considered in the differential diagnosis of postcholecystectomy problems. The clinical manifestations and management are similar to that of noniatrogenic choledocholithiasis.

Key Words: Endoclip, Common bile duct, Cholecystectomy, Endoscopic retrograde cholangiopancreatography.

INTRODUCTION

Endoclip migration into the common bile duct after laparoscopic cholecystectomy (LC) is a rare but well recognized complication. It may occur from days to years after LC. The mechanism of clip migration is poorly understood. It may be a complex process involving ineffective clip placement, inflammation around the biliary tree with localized necrosis, and pressure exerted from intraabdominal organ movement. The exact incidence is also unknown. Fewer than 75 cases have been reported in the English literature. We report a case of Endoclip migration into the common bile duct with stone formation 6 y after LC. The patient was successfully treated with endoscopic retrograde cholangiography and clip-stone extraction.

CASE REPORT

A 62-y-old male presented with recurrent upper abdominal pain and intermittent jaundice for 6 mo. He had undergone LC 6 y earlier for acute calculus cholecystitis. Dissection of the Calot's triangle was difficult, and the cystic duct was wide and edematous. The cystic duct was controlled with large size Endoclip (Ligaclip 400). A drain was placed in the right subhepatic space. The patient developed controlled biliary fistula, which healed over 17 d of conservative therapy. The patient was well for about 5.5 y. Physical examination upon the recent admission was unremarkable except for mild icteric sclera. Laboratory investigation revealed a total bilirubin of 4.8 mg/dL (normal range 0.1 to 1 mg/dL), aspartate transaminase of 46U/L (normal up to 40U/L), alanine transaminase of 36U/L (normal up to 35U/L), alkaline phosphatase of 450U/L (normal 70 to 120U/L), and gamma glutamyl transpeptidase of 680U/L (normal up to 60U/L). Ultrasound of the abdomen showed a dilated extrahepatic biliary tree to the lower end. An abdominal computed tomography (CT) scan (**Figure 1a and b**) showed a dilated bile duct with a small radio-opaque metal density in the distal common bile duct. Magnetic resonance cholangiopancreatography (MRCP) showed a dilated common bile duct with a low signal filling defect in the distal common bile duct (**Figure 2**). An endoscopic retrograde cholangiopancreatography (ERCP) was per-

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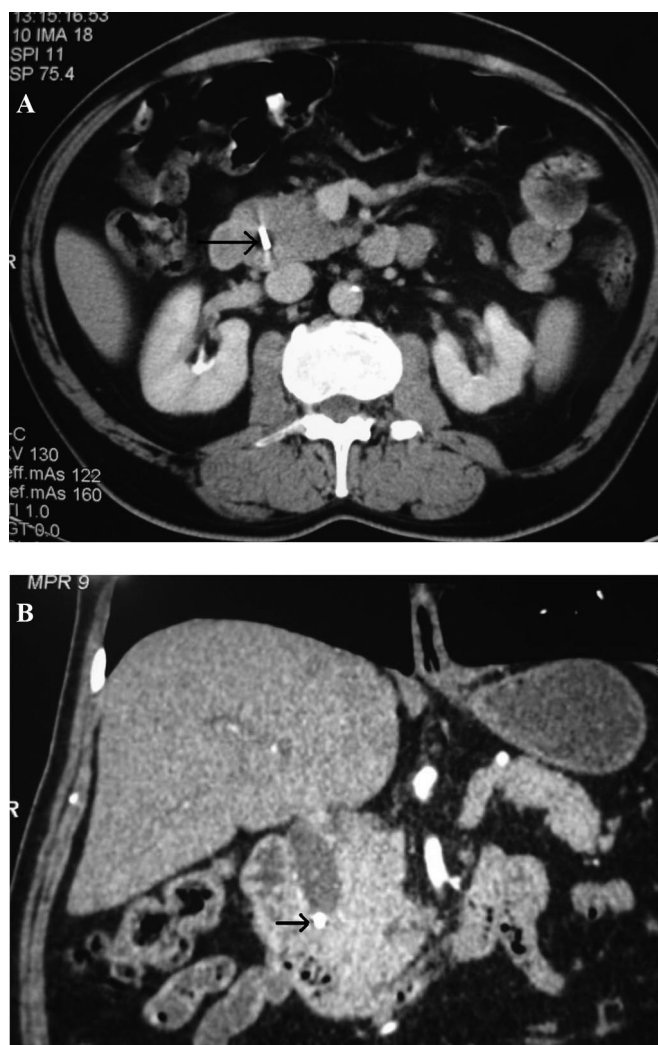


Figure 1. a. CT scan showing metallic artifact in the distal common bile duct (black arrow). **1b.** CT scan showing dilated bile duct with a metallic density at its lower end (black arrow).

formed. ERCP showed a single filling defect in the common bile duct with metallic density (Endoclip) at the center of the filling defect (**Figure 3**). A sphincterotomy was performed. The stone and 2 Endoclips were successfully removed from the bile duct. The patient had an uneventful recovery and was well at 3-mo follow-up.

DISCUSSION

LC is now the gold standard treatment for symptomatic gallstone disease. Endoclips are used to control the cystic duct and the cystic artery during LC. Their use in LC is quite safe and effective. Rarely these Endoclips may mi-

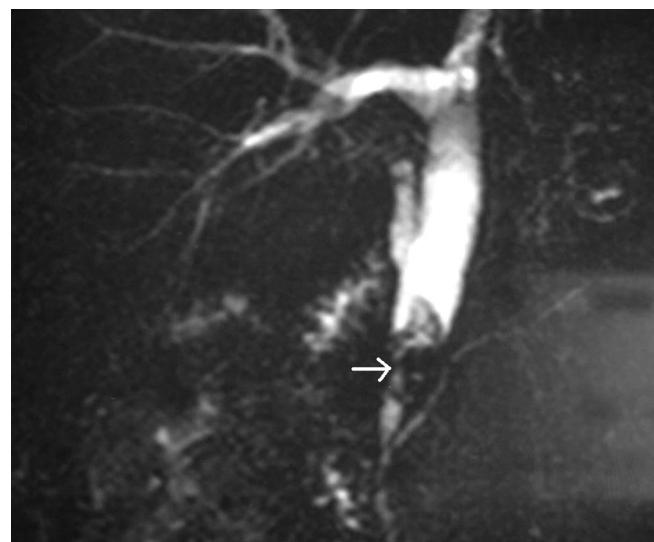


Figure 2. MRCP showing a dilated bile duct with a low signal filling defect in the lower end (white arrow).

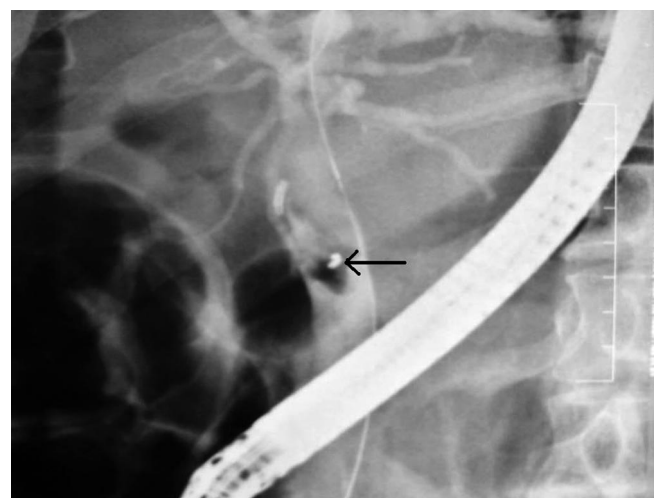


Figure 3. ERCP showing mildly dilated bile duct and a biliary stone with a radio-opaque material in the center (black arrow).

grate to cause several problems, such as choledocholithiasis,¹ cholangitis with sepsis, acute pancreatitis,² clip embolism,³ and duodenal ulcer.⁴ Choledocholithiasis and Endoclip migration after open cholecystectomy was first reported in 1979, and the same phenomenon after LC was reported in 1992.⁵ A migrated Endoclip may be found lying freely in the bile duct or may be embedded inside the stone. Overall, clip migration without stone formation occurs at a significantly shorter interval compared with stone formations (median 5.5 mo vs 36 mo).⁶ The true incidence of this complication is unknown probably for 3 reasons: (1) clip migration may go unnoticed as sponta-

neous clip migration has been reported; (2) clip migration may have gone unreported or have been included as part of other types of publications; and (3) clip migration was published in nonindexed, non-English journals. To the best of our knowledge, fewer than 75 cases have been reported in the English literature. The exact mechanism of migration of Endoclips remains unclear. Many factors may contribute to clip migration, which include ineffective closure of the cystic duct by Endoclips with bile leak, biloma formation and local infective process around the clip, inadvertent placement of clips in the wall of the bile duct during the initial operation, placement of more than 4 clips on the cystic duct stump, and cholecystectomy in the setting of acute cholecystitis and pancreatitis.⁶ Once the clip becomes embedded in the wall of the bile duct, the clip migration process will be enhanced by physical pressure exerted by intraabdominal organ movement.^{7,8} We think clip migration is more common when LC is done for acute cholecystitis. Here the cystic duct was wide and edematous, making effective closure difficult with an Endoclip. Moreover, excessive pressure by the clip applicator may have caused a cheese-wire effect and necrosis of the cystic duct stump. Suture ligation of the cystic duct is better in this setting, but some surgeons do not know intracorporeal suture placement. They always use Endoclips even in the midst of acute inflammation. In our case, cholecystectomy in the setting of acute cholecystitis with ineffective closure of the cystic duct leading to bile leak and local infective processes may have been the possible mechanism of clip migration.

The time interval for Endoclip migration into the bile duct after LC varies from 11 d to 20 y.⁶ The typical symptoms, including abdominal pain, fever, and jaundice due to biliary obstruction or sepsis due to ascending cholangitis, are not different from those of noniatrogenic choledocholithiasis. The diagnosis may be suspected based on noninvasive imaging, such as X-ray, ultrasound, CT scan, and MRCP. In our case, diagnosis was suspected on the basis of abdominal CT scan and was confirmed by ERCP. Management of this complication is straightforward. Endoscopic retrograde cholangiography with sphincterotomy and stone or clip removal should be the modality of choice. Surgery or percutaneous transhepatic cholangiography should be reserved as rescue procedures, especially in the presence of difficult biliary stricture or large stones.^{6,8,9} Lastly, every attempt should be made to prevent this complication by addressing the contributory factors. Clip migra-

tion following LC can be avoided by application of an absorbable suture or clip or ultrasonic dissection without clipping. However, these methods are not used routinely due to the high cost of their applications.

CONCLUSIONS

Although rare, clip migration with biliary complications needs to be considered in the differential diagnosis of patients presenting with postcholecystectomy problems. The clinical manifestations of clip migration are similar to that of noniatrogenic choledocholithiasis, and ERCP is currently the treatment of choice.

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